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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|--------------------------------|---------------------------------------|------------------------|
| 10/529,224 | 06/28/2005 | Stephen Christopher Neil Brown | 05039 | 8831 |
| 23338 7590 11/27/2007 DENNISON, SCHULTZ & MACDONALD 1727 KING STREET SUITE 105 ALEXANDRIA, VA 22314 | | | EXAMINER TADAYYON ESLAMI, TABASSOM | |
| | | | ART UNIT 1792 | PAPER NUMBER |
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/529,224

Applicant(s)

BROWN ET AL.

Examiner

TabassomT Tadayyon-Eslami

Art Unit

1709

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 9/2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 22-31 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 22-31 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 9/2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- ☐ Notice of Informal Patent Application
- ☐ Other: _____

DETAILED ACTION

Drawings

The drawing is received on 09/05/2007. This drawing is appropriate

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 22- 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gian Franco Cirri (US Patent # 4169976), here after Cirri in view of L. Li, " The potential role of high -power lasers in nuclear decommissioning", pages 103-115 of " Imeche Conference Transactions, Nuclear Decom (2001) Ensuring safe secure, and successful Decommissioning (ISSN: 1356-1448), here after Li.

A method for drill or shape ceramic materials comprising directing a laser beam to the substrate and moving the laser beam or the substrate with respect to each other [Column 1, lines 28-32 and 63-65]. Cirri does not teach the laser spot having average power density of from 30-200 W/Cm² nor an irradiation period of 1s to 30s. Li teaches,

A method of removing surface of concrete by a laser beam without melting or vaporizing [page 111 lines 1-2] where the laser power density is 100-300 W/ cm². He does not clearly teaches the irradiating time of the laser beam is 1s to 30s. The laser irradiation time on the surface for removing materials is result effective variable,

because the irradiation time controls the amount of the materials to be removed from the surface, therefore if it is short there is nothing removes from the surface. From the other hand, if the irradiation time is long, it will leads to melting or vaporizing the top layer [page 111 lines 1-2], which is not desirable. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention was made to have the laser irradiation time on the concrete surface optimized to remove the material from the surface without melting or vaporizing, therefore it is obvious to optimize the irradiation time to obtain the optimum time for removing layers from the surface. [MPEP 2144.05 II.B]. Therefore, claim 22 is rejected.

As to claim 2, the time interval between the successive exposures of the laser spot on the surface also been recognized as result in effectiveness because the short interval time does not allow the substrate to cool down. From the other hand long interval between the successive laser irradiation would slow down the process. Therefore it has to be optimized. The time interval depends on the thermal conductivity and the material to be removed from the surface and the amount such as 0.1-2 s or 5 times less than the time for irradiation of successive discrete locations, for the best combination of cooling and total processing time. Therefore 23 and 24 is also rejected.

The fact of using the pulsed laser beam rather than continues laser beam rejects claims 25 and 26 [Column 1, lines 28-32].

Cirri also teaches the laser pulses strike the substrate quite near each other so that they partially overlap [column 1 paragraph4, lines 8-12, fig. 2, claims 3 and 8]. In fig. 2 Cirri shows the successive discrete location make a geometric pattern and any

three consequent points which are not in a same straight line makes a triangle, therefore claims 27-29 are also rejected.

Claim 30 is rejected because it is obvious if the pattern for the laser beam in fig.2 of Cirri reference would be straight line, between the discrete locations, which overlap, there would be no area, which is not hit by laser beam at least once.

Claim 31 is rejected since Cirri teaches the distance between the center of locations irradiated by the laser spot will be less than of the radius (0.5 of the diameter) and also teaches that the distance may be at least about the diameter (when the successive pulses do not overlap). Therefore, it effectively teaches range of at least 0.5-1 diameter to have chosen 4/7-6/7 from within this range because overlapping have been hold to support a prima facie case of obviousness.

Response to Argument

Applicant's arguments, filed on 09/05/2007, with respect to the rejection(s) of claim(s) 22-31 under 35 U.S.C. 103(a) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of new reference as discussed in above rejection.

The Cirri reference discloses using of laser beam in ceramic materials combined with the Li reference which is essentially teaches using laser for scabbling the concrete surface with a power density of 100-300 W/ cm².

The applicant argued that the claimed laser beam is not essential a pulsed beam, however the claim language is not includes continues laser beam.


a.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tabassom T Tadayyon-Eslami whose telephone number is 571-272-1885. The examiner can normally be reached on 7:30-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Cleveland can be reached on 571-272-1418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

T.T


MICHAEL CLEVELAND
SUPERVISORY PATENT EXAMINER